

NOTE: Refer to the Supplement at the back of this manual for information unique to 2006-on models.

CHAPTER NINE

ELECTRICAL SYSTEM

This chapter contains service and test procedures for most electrical and ignition components. Information regarding the battery and spark plug is in Chapter Three.

Tables 1-3 are located at the end of this chapter. When inspecting a component, compare measurements to the electrical specifications in **Table 1**. Replace any component that is damaged or out of specification. During assembly, tighten fasteners to the specifications in **Table 3**.

ELECTRICAL COMPONENT REPLACEMENT

Most motorcycle dealerships and parts suppliers do not accept the return of any electrical part. If you cannot determine the *exact* cause of any electrical system malfunction, have a Honda dealership retest that specific system to verify your test results. If you purchase a new electrical component(s), install it, and then find that the system still does not work properly, you probably cannot return the unit for a refund.

Consider any test results carefully before replacing a component that tests only *slightly* out of specification, especially resistance. A number of variables can affect test results dramatically. These include the testing meter's internal circuitry, ambient temperature and conditions under which the machine has been operated. All instructions and

specifications have been checked for accuracy; however, successful test results depend to a great degree upon individual accuracy.

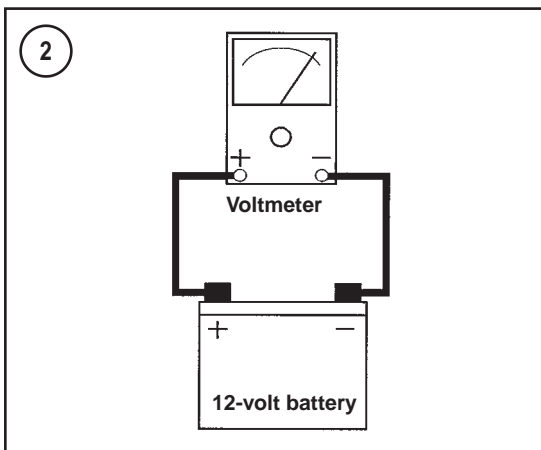
ELECTRICAL CONNECTORS

TRX250EX models are equipped with a variety of electrical components, connectors and wires. Corrosion-causing moisture can enter these connectors and cause poor electrical connections, which ultimately leads to component failure. Troubleshooting an electrical circuit with one or more corroded electrical connectors can be time-consuming and frustrating.

To prevent corrosion, pack electrical connectors with dielectric grease when reconnecting them. Dielectric grease is especially formulated for sealing and waterproofing electrical connectors, and it does not interfere with the current flow. Only use this compound or an equivalent designed for this specific purpose. Other materials may interfere with the current flow. Do not use silicone sealant.

Thoroughly clean and dry both the male and female connector halves. Pack one of the halves with dielectric grease compound before joining the two connector halves.

In addition to packing electrical connectors, make sure the ground connections are tight and free of corrosion.



The location of electrical connectors can vary between model years. If the ATV has been worked on by someone else, this person may have repositioned the connector. Always check the connector wire colors to make sure it is the correct electrical connector. To double check, follow the electrical cable from the specific component to where it connects to the wiring harness or to another electrical component within that system.

BATTERY NEGATIVE TERMINAL

Some of the procedures in this chapter require disconnecting the negative battery cable as a safety precaution.

1. Turn the ignition switch off.
2. Remove the seat as described in Chapter Fourteen.
3. Disconnect the cable from the negative battery terminal (**Figure 1**).
4. Move the cable out of the way so it does not accidentally make contact with the terminal.

5. Once the procedure is completed, connect the battery negative cable to the terminal, and tighten the bolt securely.
6. Install the seat as described in Chapter Fourteen.

CHARGING SYSTEM

The charging system consists of the battery, alternator and a voltage regulator/rectifier. A 15-amp main fuse protects the circuit. Refer to the wiring diagram in the back of the manual.

Alternating current generated by the alternator is rectified to direct current. The voltage regulator maintains the voltage to the battery and additional electrical loads at a constant level despite variations in engine speed and load.

Troubleshooting

Refer to Chapter Two.

Battery Voltage Check

To obtain accurate charging system test results, the battery must be fully charged. Check battery voltage as follows:

1. Remove the seat (Chapter Fourteen).
2. Connect a digital voltmeter across the battery negative and positive terminals and measure the battery voltage (**Figure 2**). A fully-charged battery reads between 13.0-13.2 volts. If the voltage reading is less than this amount, recharge the battery as described in Chapter Three.

Current Draw Test

Perform this test before performing the charging voltage test.

1. Remove the seat (Chapter Fourteen).
2. Turn the ignition switch off.
3. Disconnect the negative battery cable from the battery (**Figure 1**).

CAUTION

Before connecting the ammeter to the circuit, set the meter to its highest amperage scale. This prevents a large current flow from damaging the meter or blowing the meter's fuse, if so equipped.

4. Connect an ammeter between the battery negative lead and the negative terminal of the battery (**Figure 3**). Switch the ammeter from its highest to lowest amperage scale while reading the meter. If the needle swings even the slightest amount, current is draining from the system.

5. A current draw higher than 1.0 mA indicates a continuous battery discharge. Dirt and/or electrolyte on top of the battery or a crack in the battery case can cause this type of problem by providing a path for battery current to flow. Remove and clean the battery as described in Chapter Three. Reinstall the battery and retest.

6. If the current draw is still excessive, the battery is damaged or the system contains a short circuit.

7. To find the short circuit, refer to the wiring diagram at the end of this manual. Measure the current draw while disconnecting system connectors one by one. When the current rate returns to normal, the circuit just disconnected contains the short. Test that circuit further to find the problem.

8. Disconnect the ammeter from the battery and battery cable.

9. Reconnect the negative battery cable to the battery.

10. Install the seat (Chapter Fourteen).

Regulated Voltage Test

This procedure tests charging system operation. It does not measure maximum charging system output. **Table 1** lists charging system specifications.

To obtain accurate test results, the battery must be fully charged. Check the battery voltage as described in this section. Charge the battery if necessary.

1. Start and run the engine until it reaches normal operating temperature, and then turn the engine off.

2. Connect a tachometer to the engine following its manufacturer's instructions.

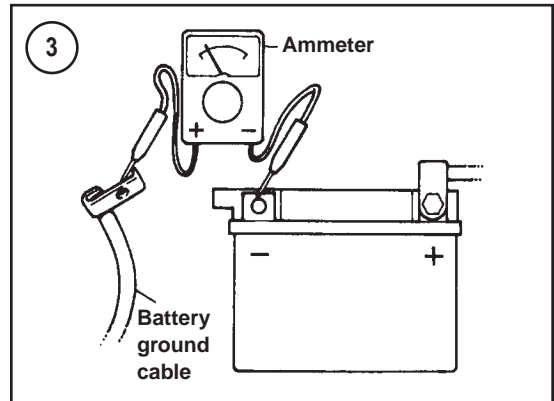
3. Connect a 0-20 DC voltmeter to the battery terminals as shown in **Figure 2**.

4. Start the engine and let it idle.

5. Turn the headlight to HI beam.

6. Gradually increase engine speed from idle to 5000 rpm and note the reading on the voltmeter. It should equal the regulated voltage specification.

- If the regulated voltage is less than specified, the wiring harness may have an open or short, the alternator may have an open or short or the regulator/rectifier may be faulty.



- If the regulated voltage exceeds specification, the regulator/rectifier may be poorly grounded, the battery may be faulty or the regulator/rectifier is faulty.

7. Shut off the engine and disconnect the voltmeter and tachometer.

8. Install the seat (Chapter Fourteen).

Regulator/Rectifier Harness Test

1. Remove the seat and the left side cover as described in Chapter Fourteen.

2. Disconnect the 5-pin connector (A, **Figure 4**) from the regulator/rectifier.

3. Check the connector for loose or corroded terminals.

NOTE

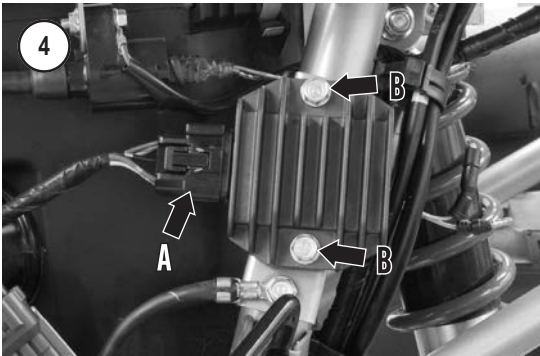
Perform all tests (Steps 4-6) on the harness side of the connector; not on the regulator/rectifier side.

4. Check the battery lead by performing the following:

- Connect a voltmeter between the red and green terminals in the connector.
- With the ignition switch off, the voltmeter should read 13.0-13.2 volts (battery voltage).
- If the reading is less than battery voltage, check both wires for damage.
- Disconnect the voltmeter leads.

5. Check the ground wire continuity by performing the following:

- Connect an ohmmeter between the green wire and a good engine ground.
- The ohmmeter should indicate continuity (zero or low resistance).



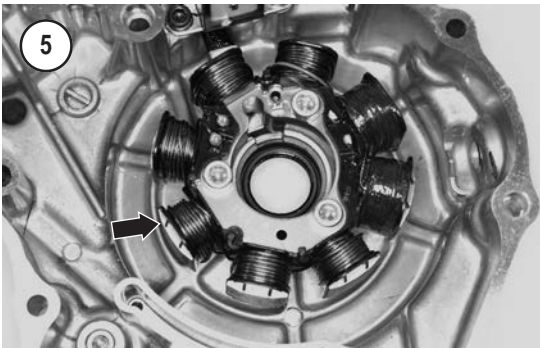
3. Disconnect the 5-pin connector (A, **Figure 4**) from the regulator/rectifier.
4. Remove the bolts securing the regulator/rectifier (B, **Figure 4**) to the frame and remove it.
5. Install by reversing the preceding removal steps.

ALTERNATOR

The alternator consists of the flywheel and stator coil assembly. Flywheel and stator removal/installation procedures are in Chapter Five.

Flywheel Testing

The flywheel is permanently magnetized and cannot be tested except by replacing it. A rotor can lose magnetism over time or from a sharp blow. Replace the flywheel if it is defective or damaged.



- c. If there is no continuity (infinite resistance), check the green wire for damage.
6. Check the charge leads by performing the following:
 - a. Measure resistance across the two yellow terminals in the connector. It should equal the specified charge coil resistance (**Table 1**).
 - b. A reading of infinity indicates an open circuit. Test the stator coil resistance as described in this chapter.
 - c. If the resistance reading is excessive, check for dirty or loose-fitting terminals or damaged wires.
7. If all the tests are within specification, the harness is working properly. Replace the regulator/rectifier as described in this section.
8. Reconnect the regulator/rectifier electrical connector (A, **Figure 4**).

Regulator/Rectifier Removal/Installation

1. Remove the seat and the left side cover (Chapter Fourteen).
2. Disconnect the negative battery cable from the battery.

Charge Coil Resistance Test

NOTE

The stator coil is also referred to as the charge coil.

The charge coil (**Figure 5**) is part of the stator assembly, which is mounted inside the alternator cover. This test can be performed with the alternator cover mounted on the engine.

1. Remove the seat and the left side cover as described in Chapter Fourteen.
2. Check the regulator/rectifier connector by performing the following:
 - a. Disconnect the regulator/rectifier 5-pin connector (A, **Figure 4**).
 - b. Measure the resistance across the two yellow wire terminals in the harness side of the connector. It should equal the specified charge coil resistance (**Table 1**).
 - c. Check the continuity between each yellow terminal in the connector and a good ground. There should be no continuity (infinite resistance).
 - d. If either yellow wire has continuity to ground (low resistance), perform Step 3.
3. Check the charge coil resistance and continuity at the alternator connector by performing the following:
 - a. Disconnect the red, 3-pin alternator connector (A, **Figure 6**).

- b. Measure the resistance across the two yellow wire terminals in the alternator side of the connector. The charge coil is faulty if the resistance exceeds specification.
- c. Check the continuity between each yellow terminal in the alternator side of the connector and a good engine ground. There should be no continuity. If either terminal has continuity to ground, the charge coil is shorted and must be replaced.

NOTE

Before replacing the stator assembly, check the electrical wires to and within the electrical connector for any open or poor connections.

4A. If the charge coil fails either test at the alternator connector (Step 3), the charge coil is faulty. Replace the stator assembly as described in *Alternator Cover* in Chapter Five.

4B. If the charge coil fails a test at the regulator/rectifier connector (Step 2) but passes the tests at the alternator connector (Step 3), replace the regulator/rectifier harness.

5. Apply a dielectric grease to the alternator connector before reconnecting it. This helps seal out moisture.

IGNITION SYSTEM

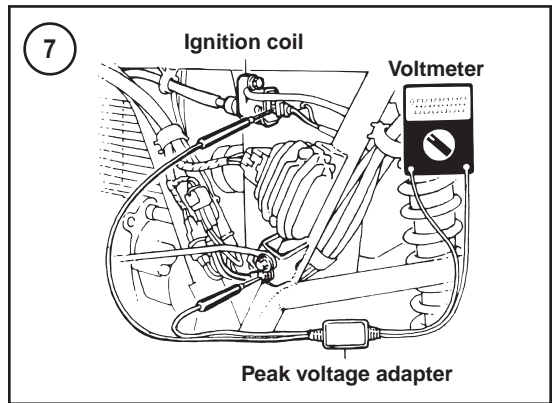
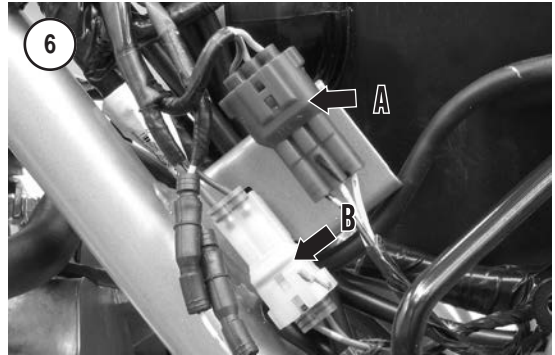
All models are equipped with a capacitor discharge ignition system. Refer to the wiring diagram at the end of this manual.

Tools

Various peak voltage tests are used to test the ignition system. These tests require either a peak voltage tester or the Honda peak voltage adapter (part No. 07HGJ-0020100) used with a commercially available digital multimeter (minimum impedance: 10 M ohms/DCV). If these tools are not available, refer the tests to a Honda dealership.

Precautions

When working on the ignition system, protect the system by taking the following precautions:



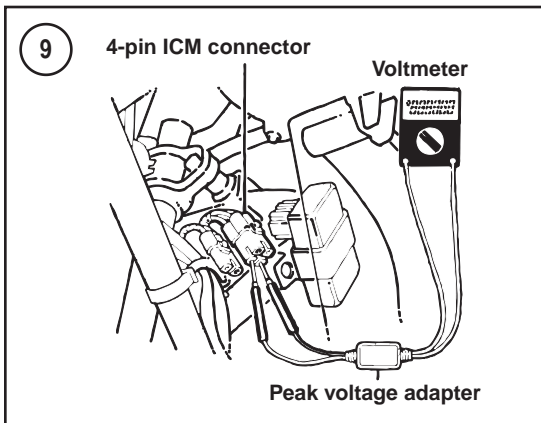
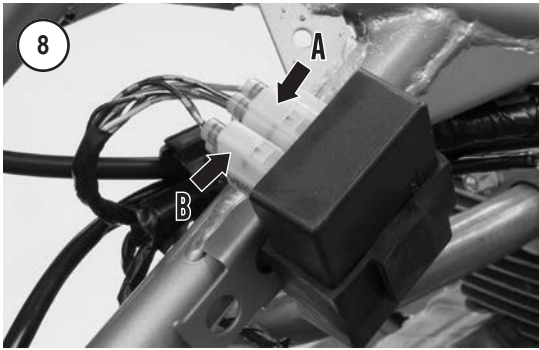
1. Never disconnect any electrical connection while the engine is running.
2. Apply dielectric grease to all electrical connectors before reconnecting them. This helps seal out moisture.
3. The electrical connectors must be free of corrosion and properly connected.
4. The ignition control module (ICM) is mounted in a rubber mount. The ICM must always be reinstalled into its rubber mount after service or testing.

Troubleshooting

Refer to Chapter Two.

Ignition Coil Primary Peak Voltage Test

1. Check the engine compression as described in Chapter Three. The following test results are inaccurate if engine compression is low.
2. Check all electrical connections in the ignition system. They must be clean and tight.



3. Disconnect the spark plug cap from the spark plug.
4. Install a known good spark plug into the plug cap, and ground the spark plug against the cylinder or cylinder head.
5. Connect the peak voltage adapter to the multimeter following the manufacturer's instructions.
6. Connect the peak voltage adapter's positive lead to the black/yellow terminal on the ignition coil, and connect the adapter's negative lead to a good ground. Make sure the ignition coil primary wire is still connected to the ignition coil. Refer to **Figure 7**.
7. Turn the ignition on and the engine stop switch to RUN.
8. Shift the transmission into neutral.
9. Press the starter button and read the peak voltage on the voltmeter. The reading should exceed the ignition coil peak voltage specification in **Table 1**. Record the peak voltage reading.
 - a. If the peak voltage reading is less than specified, check for an open or a poor connection on the black/yellow wire. If this is not the source of the problem, refer to *Ignition Sys-*

tem in Chapter Two. Locate the description that best describes the results obtained from this peak voltage test, and perform the indicated checks.

Ignition Pulse Generator Peak Voltage Test

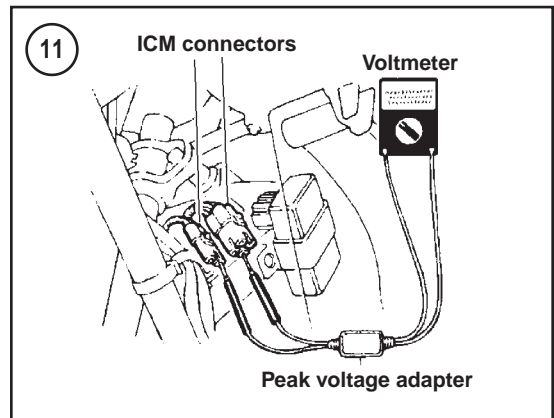
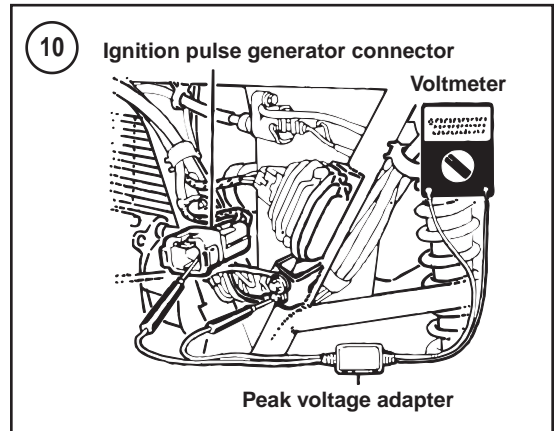
1. Check the engine compression as described in Chapter Three.
2. Confirm that the spark plug and plug cap are correctly installed.
3. Remove the seat and left side cover as described in Chapter Fourteen.
4. Shift the transmission into neutral.
5. Connect a peak voltage adapter to the multimeter following the manufacturer's instructions.
6. Measure the peak voltage at the ICM connector by performing the following:
 - a. Disconnect the 4-pin ICM connector (A, **Figure 8**) from the ICM.
 - b. Connect the peak voltage adapter's positive lead to the black/yellow terminal on the 4-pin ICM connector, and connect the adapter's negative lead to green/ white terminal. Refer to **Figure 9**.
- c. Turn the ignition on and the engine stop switch to RUN.
- d. Press the starter button and read the peak voltage on the voltmeter. The reading should exceed the pulse generator peak voltage specification in **Table 1**. Record the peak voltage reading.
7. If the peak voltage reading is less than specified, measure the peak voltage at the ignition pulse generator connector by performing the following:
 - a. Disconnect the 2-pin ignition pulse generator connector (B, **Figure 6**).
 - b. Connect the peak voltage adapter's positive lead to the blue/yellow terminal on the 2-pin connector, and connect the adapter's negative lead to a good ground. Refer to **Figure 10**.
 - c. Turn the ignition on and the engine stop switch to RUN.
 - d. Press the starter button and read the peak voltage on the voltmeter. The reading should exceed the pulse generator peak voltage specification. Record the peak voltage reading.
8. Compare the two test readings.
 - a. If the peak voltage at the 2-pin ignition pulse generator connector is within specification

but the peak voltage at the 4-pin ICM connector is less than specified, the wiring harness is faulty. Check for an open or loose connection.

- b. If both peak voltage readings are less than specified, refer to *Ignition System* in Chapter Two. Locate the description that best describes the results obtained from this peak voltage test, and perform the indicated checks.

Exciter Coil Peak Voltage Test

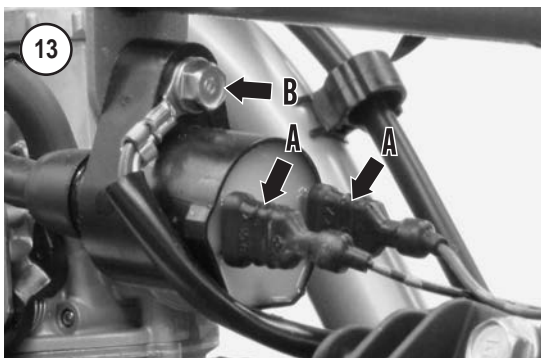
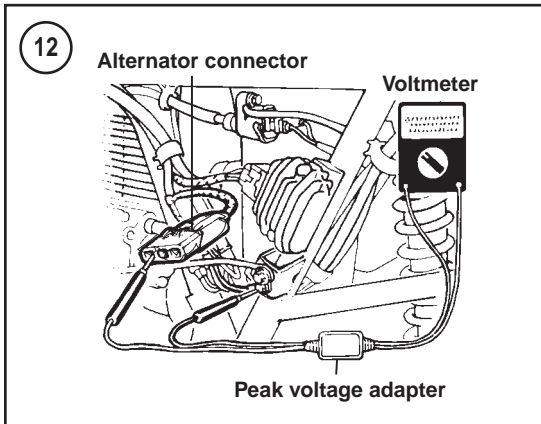
1. Check the engine compression as described in Chapter Three.
2. Confirm that the spark plug and plug cap are correctly installed.
3. Remove the seat and left side cover as described in Chapter Fourteen.
4. Shift the transmission into neutral.
5. Connect a peak voltage adapter to the multimeter following the manufacturer's instructions.
6. Measure the peak voltage at the ICM connectors by performing the following:
 - a. Disconnect the 4-pin connector (A, **Figure 8**) and the 2-pin connector (B) from the ICM.
 - b. Connect the peak voltage adapter's positive lead to the black/red terminal in the 2-pin connector, and connect the adapter's negative lead to green/white terminal in the 4-pin ICM connector. Refer to **Figure 11**.
- c. Turn the ignition on and the engine stop switch to RUN.
- d. Press the starter button and read the peak voltage on the voltmeter. The reading should exceed the exciter coil peak voltage specification. Record the peak voltage reading.
7. If the peak voltage reading is less than specified, measure the peak voltage at the alternator connector by performing the following:
 - a. Disconnect the 3-pin alternator connector (A, **Figure 6**).
 - b. Connect the peak voltage adapter's positive lead to the black/red terminal on the alternator connector, and connect the adapter's negative lead to a good ground. Refer to **Figure 12**.
 - c. Turn the ignition on and the engine stop switch to RUN.
 - d. Press the starter button and read the peak voltage on the voltmeter. The reading should exceed the exciter coil peak voltage specification. Record the peak voltage reading.



8. Compare the two test readings.
 - a. If the peak voltage at the alternator connector is within specification but the peak voltage at the ICM connectors is less than specified, the wiring harness is faulty. Check for an open or loose connection.
 - b. If both peak voltage readings are less than specified, refer to *Ignition System* in Chapter Two. Locate the description that best describes the results obtained from this peak voltage test, and perform the indicated checks.

Ignition Control Module (ICM) Removal/Installation

1. Remove the front fender as described in Chapter Fourteen.
2. Remove the 4-pin (A, **Figure 8**) and 2-pin (B) ICM connectors from the ignition control unit.
3. Pull the ICM unit from its rubber mount.



4. Install the new unit in the rubber mount, and connect both connectors.
5. Reinstall the front fender (Chapter Fourteen).

Ignition Coil Removal/Installation

1. Remove the fuel tank and heat guard as described in Chapter Eight.
2. Remove the spark plug cap from the spark plug, and release the spark plug wire from its clamp.
3. Disconnect the primary wires (A, **Figure 13**) from the ignition coil terminals.
4. Remove the mounting bolt (B, **Figure 13**) and ignition coil/wire assembly.
5. Installation is the reverse of removal.

Stator/Ignition Pulse Generator Removal

The ignition pulse generator and the stator form an assembly that mounts to the inside of the alternator cover. Neither can be replaced separately. Refer to *Alternator Cover Disassembly/Assembly* in Chapter Five for replacement procedures.

STARTER

The starting system consists of the starter, starter gears, starter relay and the starter button.

Starter gear service is covered in Chapter Five.

Troubleshooting

Refer to Chapter Two.

Removal/Installation

1. Park the vehicle on level ground and set the parking brake.
2. Remove the seat, side covers and rear fender as described in Chapter Fourteen.
3. Disconnect the negative battery cable from the battery.
4. Remove the boot from the starter terminal, and disconnect the starter cable (A, **Figure 14**) from the starter.

CAUTION

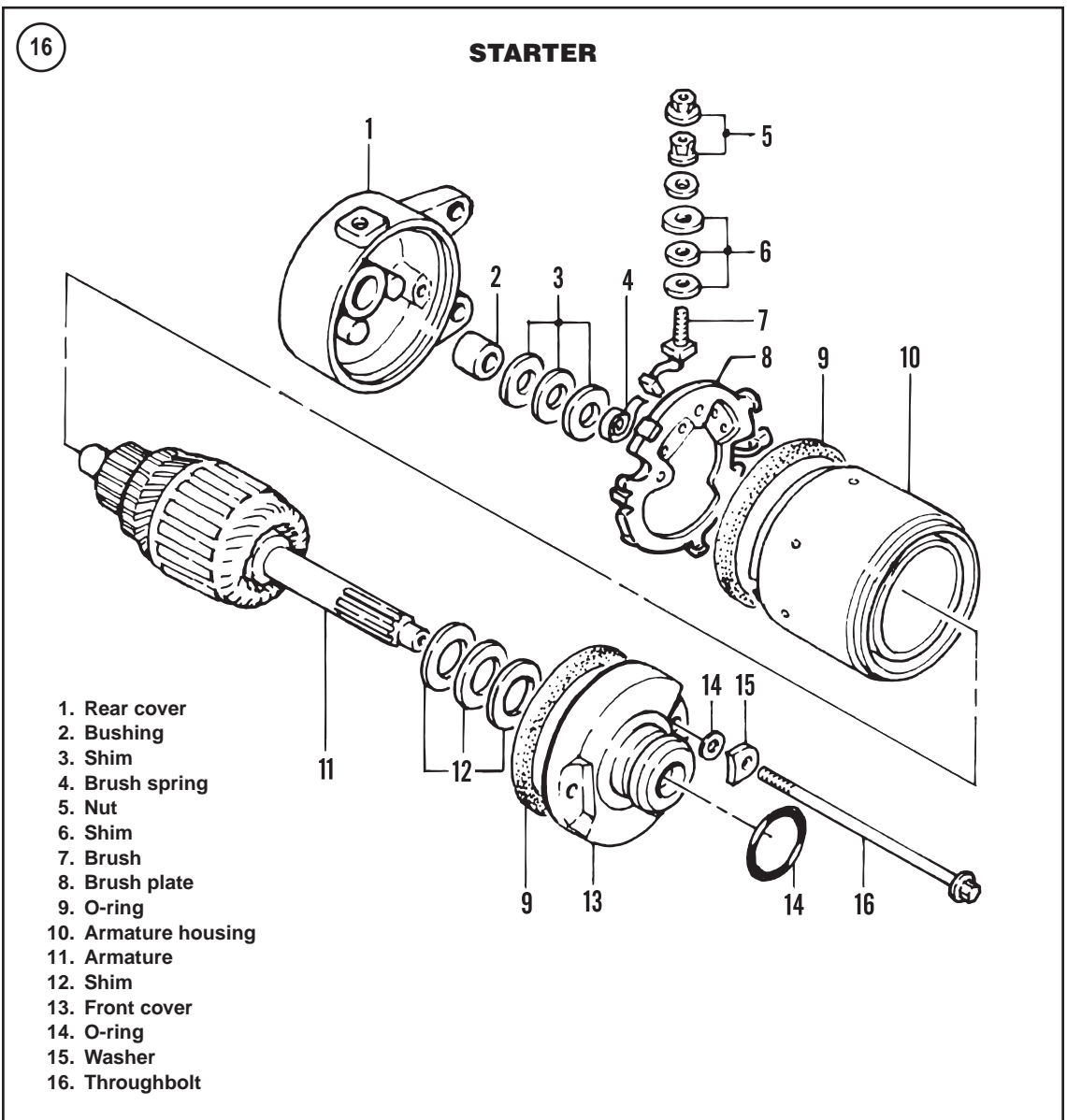
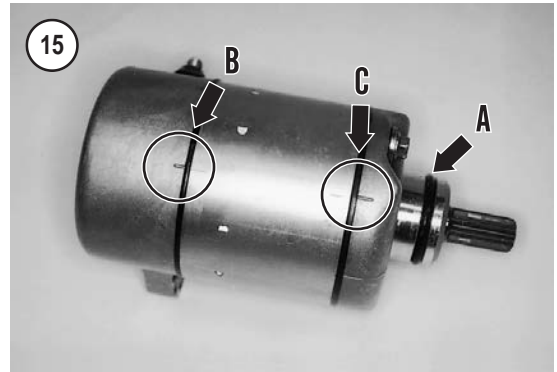
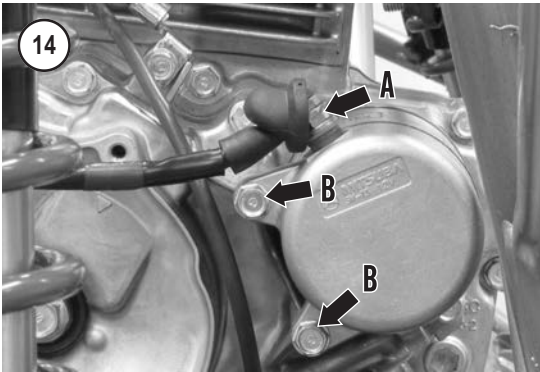
Do not operate the starter for more than 5 seconds at a time. Let the starter cool approximately 10 seconds, and then try again.

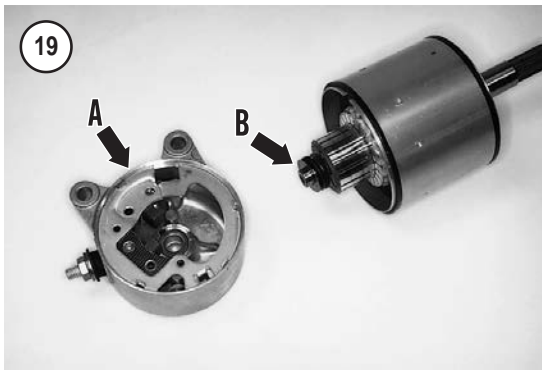
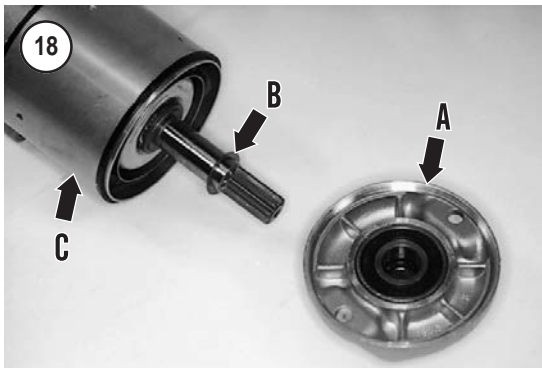
5. Remove the two starter mounting bolts (B, **Figure 14**) and remove the starter.
6. If necessary, service the starter as described in this chapter.
7. Install the starter by reversing the preceding removal steps. Pay attention to the following:
 - a. Lubricate the starter O-ring (A, **Figure 15**) with grease.
 - b. Clean any rust or corrosion from the round terminal on the starter cable.
 - c. Tighten the starter mounting bolts securely.

Disassembly

Refer to **Figure 16**.

1. Find the alignment marks (B and C, **Figure 15**) across the armature housing and both covers. If necessary, make your own marks.
2. Remove the two throughbolts, washers, lock-washers and O-rings (**Figure 17**).



**NOTE**

Record the thickness and alignment of each shim and washer removed during disassembly.

NOTE

The number of shims used in each starter varies. The starter you are working on may use a different number of shims from that shown in the following photographs.

3. Remove the front cover (A, **Figure 18**).
4. Remove the front shims (B, **Figure 18**) from the armature shaft.
5. Remove the rear cover (A, **Figure 19**) from the armature housing.
6. Remove the rear shim set (B, **Figure 19**).

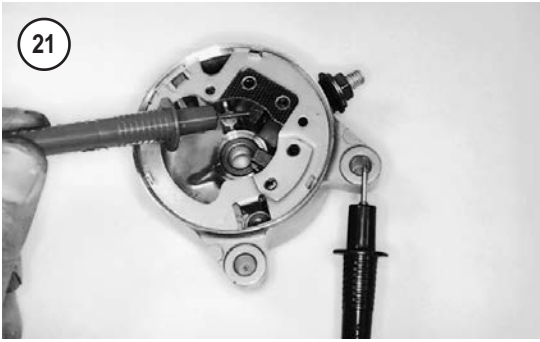
CAUTION

Wipe the windings with a cloth lightly moistened with solvent. Do not immerse the wire windings in the case or the armature in solvent. This could damage the insulation.

7. Clean all grease, dirt and carbon from the armature, housing and covers.

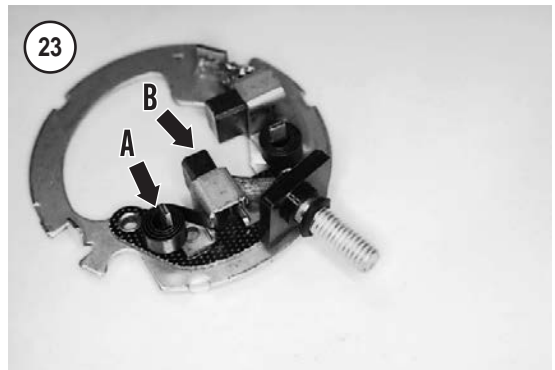
Inspection

1. Use an ohmmeter to perform the following:
 - a. Check the continuity between the terminal bolt and the brush wire (the indigo-colored wire or the insulated brush holder). Refer to **Figure 20**. There should be continuity (low resistance).
 - b. Check the continuity between the rear cover and the brush wire (the indigo-colored wire or the insulated brush holder). Refer to **Figure 21**. There should be no continuity (infinite resistance).
 - c. Replace the starter if the rear cover fails either test.
2. Remove the nut and washers from the terminal bolts in the rear cover (**Figure 22**). Note the order of the parts as they are removed. The washers must be reinstalled in their original positions.
3. Pull the brush plate (**Figure 22**) out of the end cover.
4. Pull each spring (A, **Figure 23**) away from its brush, and pull the brush (B) from its brush holder.



5. Measure the length of each brush (**Figure 24**). If the length of either brush is less than the service limit in **Table 1**, replace both brushes as a set. When replacing the brushes, note the following:

- The starter brushes do not require soldering during replacement.
- Replace the terminal bolt and its brush (A, **Figure 25**) as an assembly.
- Replace the brush plate and its brush (B, **Figure 25**) as an assembly.
- Install the terminal bolt washer set (**Figure 22**) in the order noted during removal.



6. Inspect the brush springs. Replace them both if either is weak or damaged. To replace the brush springs, perform the following:

- Make a drawing that shows the location of the brush springs on the brush holder. Also indicate the direction in which each spring coil turns.
- Remove and replace both brush springs as a set.

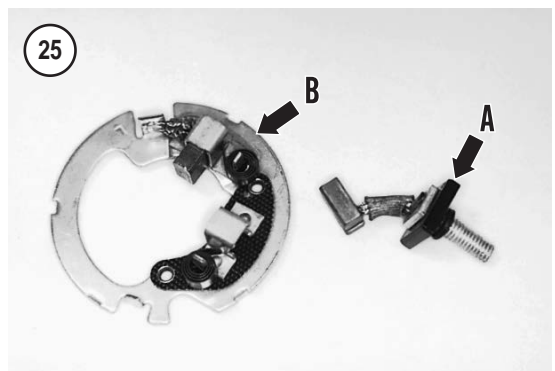
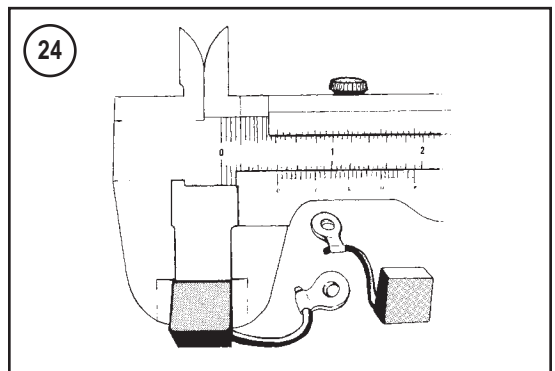
7. Inspect the armature shaft (A, **Figure 26**) for excessive wear, scoring or other damage.

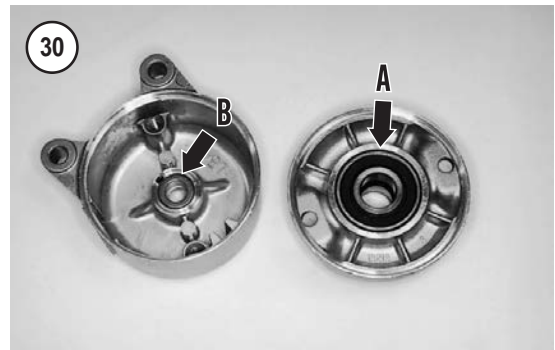
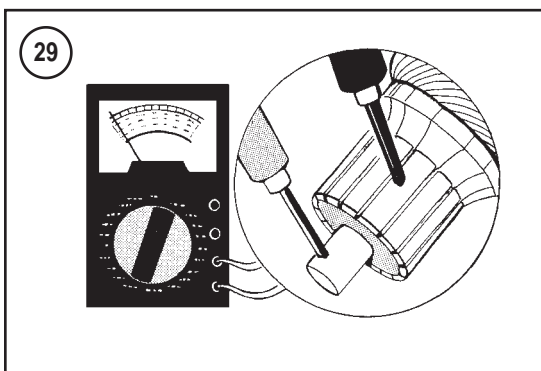
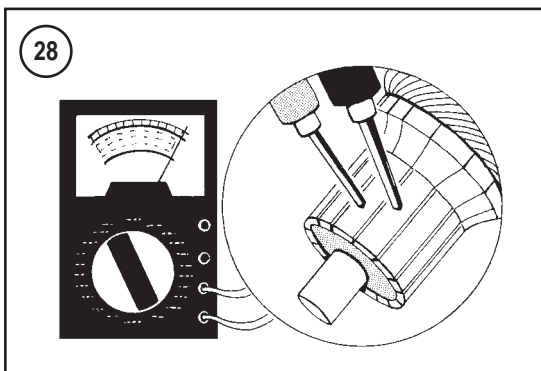
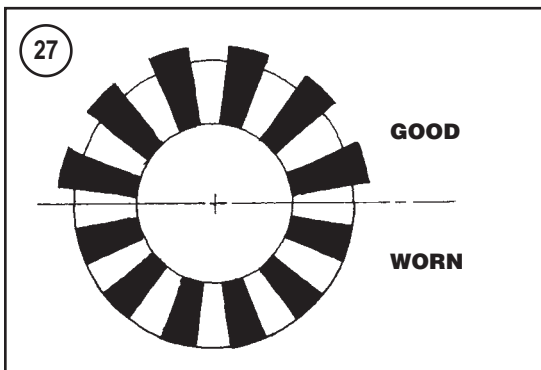
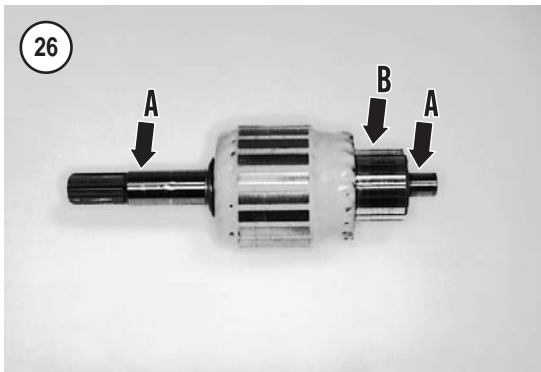
8. Inspect the commutator (B, **Figure 26**). The mica must be below the surface of the copper bars. On a worn commutator the mica and copper bars may be worn to the same level (**Figure 27**). If necessary, have the commutator serviced by a dealership or electrical repair shop.

9. Inspect the commutator copper bars for discoloration. A discolored pair of bars indicates grounded armature coils.

10. Use an ohmmeter and perform the following:

- Check for continuity between the commutator bars (**Figure 28**). There should be continuity (low resistance) between pairs of bars.
- Check for continuity between the commutator bars and shaft (**Figure 29**). There should be no continuity (infinite resistance).





9

NOTE

The covers and armature housing are not available separately. If either part is worn or damaged, replace the starter.

- c. If the armature fails either of these tests, replace the starter.

11. Inspect the front cover bearing (A, **Figure 30**). Also inspect the dust seal behind the bearing. Replace the starter if either part is excessively worn or damaged.

12. Inspect the rear cover bushing (B, **Figure 30**). Replace the starter if the bushing is damaged.

13. Inspect the armature housing (**Figure 31**) for cracks or other damage. Then inspect for loose, chipped or damaged magnets.

14. Inspect all O-rings. Replace any that is worn or starting to harden.

Assembly

1. If removed, install the brushes into their holders. Secure the brushes in place with the springs.
2. Align the tab on the brush plate with the notch in the rear cover, and install the brush plate (A, **Figure 32**) into the cover.

3. Install the rear shims (B **Figure 32**) onto the commutator end of the armature shaft.
4. Insert the armature into the rear cover (**Figure 33**). Turn the armature during installation so the brushes engage the commutator properly. Do not damage the brushes. During assembly, keep the commutator end of the armature up. If it is angled downward, the shims could slide off the armature shaft.
5. Install the two O-rings onto the armature housing. Then slide the housing (C, **Figure 18**) over the armature. Align the indexing marks on the housing and rear cover (B, **Figure 15**).
6. Install the front shims (B, **Figure 18**) onto the armature shaft.
7. Install the front cover (A, **Figure 18**) over the armature shaft. Align the indexing marks on the front cover and the armature housing (C, **Figure 15**).

NOTE

If one or both throughbolts do not pass through the starter, the covers and/or brush plate are installed incorrectly.

8. Lubricate the throughbolt O-rings with oil.
9. Install the bolts, washers and O-rings (**Figure 17**) and tighten the bolts securely.

STARTER RELAY

System Test

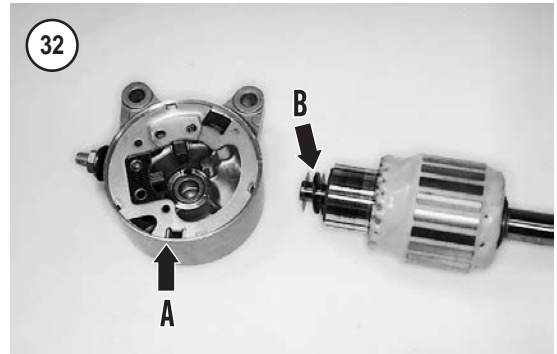
System testing of the starter relay switch is described in *Starting System* in Chapter Two.

Operation Check

1. Remove the seat (Chapter Fourteen).
2. Turn the ignition switch on and depress the starter button. The starter relay (**Figure 34**) should click. If the starter relay does not click, perform the *Voltage Test* described in this section.
3. Turn the ignition switch off and install the seat (Chapter Fourteen).

Voltage Test

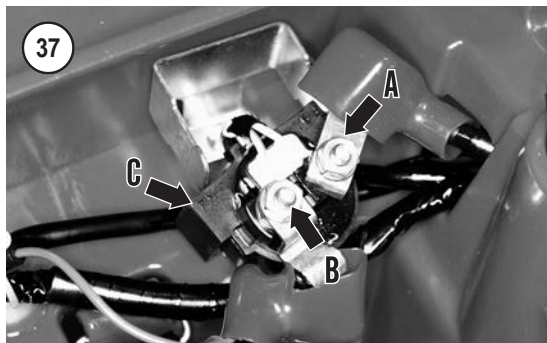
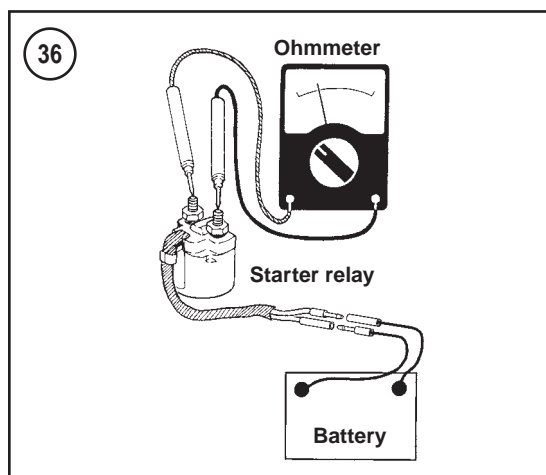
1. Remove the seat (Chapter Fourteen).
2. Disconnect the two starter relay bullet connectors (**Figure 35**).



NOTE

This test can be performed with the fender installed. The starter relay bullet connectors (light green and yellow/red wires) are located beside the regulator/rectifier, under the rear fender on the left side of the vehicle.

3. Connect a voltmeter between the starter relay connector yellow/red and light green terminals on the harness side of the connectors.
4. Shift the transmission into neutral and turn the ignition switch on. Press the starter button and read



the voltage on the meter. It should read battery voltage. If the voltmeter reading is incorrect, perform the *Continuity Test* described in this section.

5. Turn the ignition switch off.
6. Reverse Steps 1-3 to complete installation.

Continuity Test

1. Remove the starter relay (**Figure 34**) as described in this section.

2. Connect an ohmmeter to the battery and starter terminals (**Figure 36**) on the starter relay.
3. Momentarily connect a fully-charged 12-volt battery to the starter relay switch terminals as shown in **Figure 36** while reading the resistance on the ohmmeter.
4. The relay must have continuity when battery voltage is applied and no continuity when the battery is disconnected from the relay.
5. If either reading is incorrect, replace the starter relay and retest.

Removal/Installation

1. Remove the seat (Chapter Fourteen).
2. Disconnect the negative battery cable from the battery (Chapter Three).
3. Slide the rubber boots back from the starter relay terminals.
4. Remove the mounting nuts and disconnect the starter lead (A, **Figure 37**) and battery lead (B) from the starter relay.

NOTE

The starter relay bullet connectors (light green and yellow/red wires) are found beside the regulator/rectifier. Look underneath the rear fender on the left side of the vehicle.

5. Disconnect the two starter relay bullet connectors (**Figure 35**).
6. Pull the starter relay harness from the fender (**Figure 38**).
7. Pull the starter-relay rubber mount (C, **Figure 37**) from the mounting bracket, and remove the starter relay.
8. Install the starter relay by reversing the removal procedures.

DIODE

A diode is installed in the starting circuit (**Figure 39**). Test the diode when troubleshooting a neutral indicator circuit problem.

Removal/Installation

1. Remove the seat (Chapter Fourteen).
2. Disconnect the negative battery cable from the battery (Chapter Three).

3. Remove the tape from around the diode (**Figure 39**), and disconnect the diode from the wiring harness.
4. Reverse Steps 1-3 to install the diode.

Continuity Test

1. Remove the diode as described in this chapter.
2. Check for continuity between the two terminals of the diode as shown in **Figure 40**.
3. Reverse the ohmmeter leads and recheck for continuity.
4. The diode should have continuity during Step 2 but no continuity (infinite resistance) with the leads reversed. Refer to the wiring diagrams at the end of the manual.
5. Replace the diode if it fails the continuity test.

LIGHTING SYSTEM

The lighting system consists of a headlight, tail-light and indicator lights. Always use the correct bulb (**Table 2**). Using the incorrect wattage produces a dim light or causes the bulb to burn out prematurely. It is possible to replace both bulbs without removing the fenders or housings. They are removed here for clarity.

Headlight Bulb Replacement

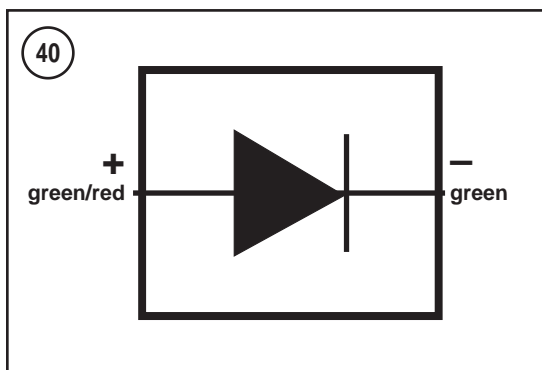
WARNING

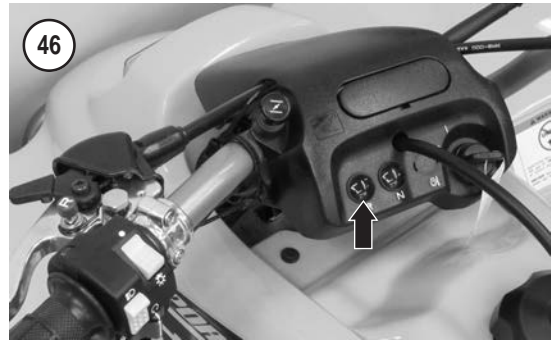
If the headlight just burned out or if it has just been turned off, it is hot. Do not touch the bulb until it cools.

1. Disconnect the wiring harness from the back of the headlight (**Figure 41**).
2. Twist the bulb holder to the left to remove it from the housing (**Figure 42**).
3. Remove the bulb from the socket.
4. Installation is the reverse of removal. The headlight bulb socket can only go into the housing one way. Make sure to correctly align the tabs before installing the socket.
5. Check headlight operation.

Headlight Housing Removal/Installation

1. Disconnect the wiring harness from the back of the headlight (**Figure 41**).





2. Remove the front fender as described in Chapter Fourteen.
3. Remove the four screws securing the housing to the fender (**Figure 43**).
4. Installation is the reverse of removal.

Taillight Bulb Replacement

1. Turn the bulb socket (**Figure 44**) counterclockwise, and remove it from the lens housing.
2. Remove the old bulb (**Figure 45**).
3. Reverse these steps to install a new bulb.
4. Start the engine and check taillight operation.



Indicator Bulb Replacement

The indicator bulbs are mounted in the handlebar cover. The bulbs can be removed with the handlebar cover in place.

1. Remove the lens (**Figure 46**) from the socket.
2. Pull the socket (**Figure 47**) from the handlebar cover and then remove the bulb.
3. Reverse these steps to install the new bulb. When installing the socket, align the tab on the socket with the groove in the handlebar cover.
4. Start the engine and check bulb operation.



SWITCHES

Testing

Test the switches by performing a continuity test with an ohmmeter (see Chapter Two) or a test light. Disconnect each switch connector and check the continuity while operating the switch in each of the positions shown in the continuity diagram.

For example, **Figure 48** shows a continuity diagram for the ignition switch. When the ignition

switch is on, there should be continuity between the black and red terminals. This is indicated by the line on the continuity diagram connecting these two terminals. An ohmmeter connected across the black and red terminals should indicate little or no resistance, or a test light should light when the switch is turned on. When the ignition switch is off, there should be no continuity between these two terminals.

Before testing a switch, note the following:

- 1. Check the fuse (**Figure 49**) as described in *Fuse* in this chapter.
- 2. Check the battery as described in *Battery* in Chapter Three. Charge the battery if required.
- 3. Disconnect the negative battery lead from the battery if the switch connectors are not disconnected from the circuit.

CAUTION

Do not start the engine with the battery disconnected.

- 4. When separating two connectors, pull the connector housings and not the wires.
- 5. After locating a defective circuit, check the connectors to make sure they are clean and properly connected. Check all wires going into a connector housing to make sure each wire is properly positioned and that the wire end is not loose.
- 6. When reconnecting electrical connector halves, push them together until they click or snap into place.

Left Handlebar Switch Replacement

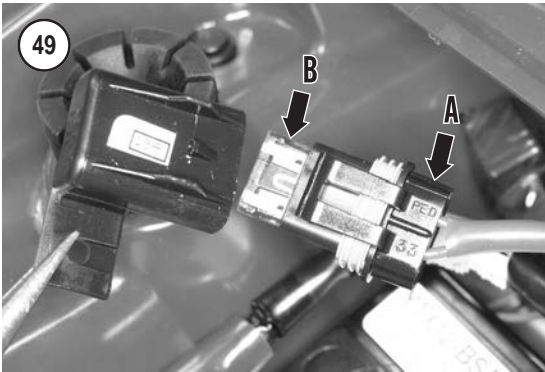
NOTE

The switches mounted in the left handlebar switch housing are not available separately. If one switch is damaged, replace the switch housing assembly.

- 1. Remove the handlebar cover and front fender as described in Chapter Fourteen.
- 2. Remove any clamps securing the switch wiring harness to the handlebar. Note how the switch harness is routed through the frame. The harness on the new switch must follow the same path.
- 3. Disconnect the handlebar switch red, 3-pin connector (**Figure 50**) and the two handlebar switch bullet connectors. These connectors are located behind the ICM on the left frame member.



48	IGNITION SWITCH			
	B	R	G	B/W
OFF			● — ●	
ON	● — ●			





4. Remove the switch housing screws (**Figure 51**) and separate the switch halves. Remove the switch and its wiring harness from the frame.

5. Install the switch housing by reversing these removal steps. Note the following:

- Fit the pin on the rear switch housing half into the hole in the handlebar (**Figure 52**), and then install the switch housing.
- Tighten the upper switch housing screw first and then the lower screw.

6. Start the engine and check the switch in each of its operating positions.

Ignition Switch Replacement

The ignition switch mounts to the handlebar cover (**Figure 53**).

1. Remove the handlebar cover and front fender as described in Chapter Fourteen.

2. Disconnect the ignition switch wiring harness from the clamp on the bottom of the handlebar cover. Note how the harness is routed through the frame. The new harness must follow the same path.

3. Disconnect the ignition switch 3-pin connector (A, **Figure 54**) and its bullet connector (B, green wire). These connectors are located on the left frame member, just forward of the ICM.

4. Press the switch arms together (**Figure 55**), and push the ignition switch out the bottom side of the cover. Remove the switch and its harness.

5. Install the ignition switch by reversing the preceding steps, plus the following:

- Install the new switch by aligning its two tabs with the notch in the switch mounting hole, and then push the switch in place. Make sure the arms lock the ignition switch into place in the handlebar cover (**Figure 56**).
- Turn the ignition switch on and check its operation.

Neutral/Reverse Switch Continuity Test

The neutral and reverse switches are mounted on the outside of the alternator cover for 2001-2002 models. 2003-on models have the switch mounted on the inside of the cover.

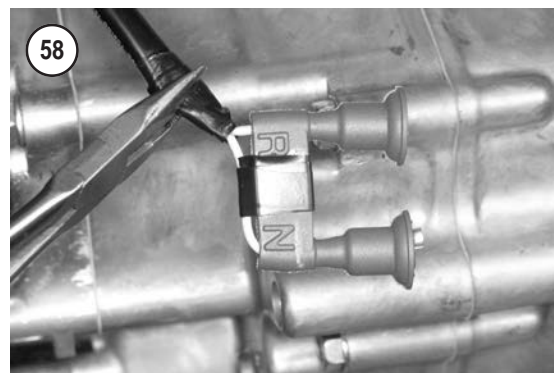
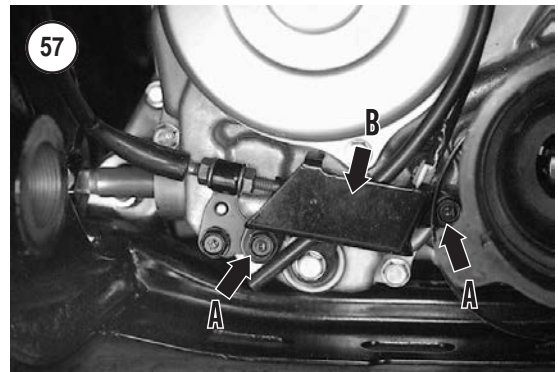
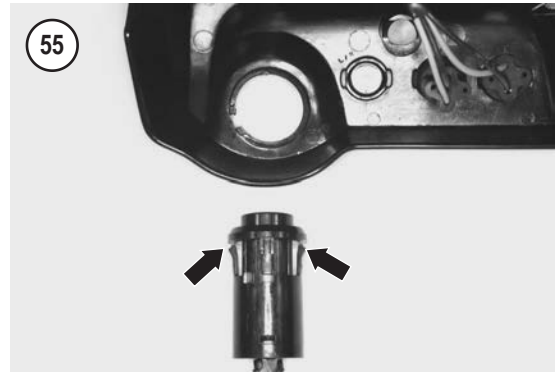
2001-2002 models

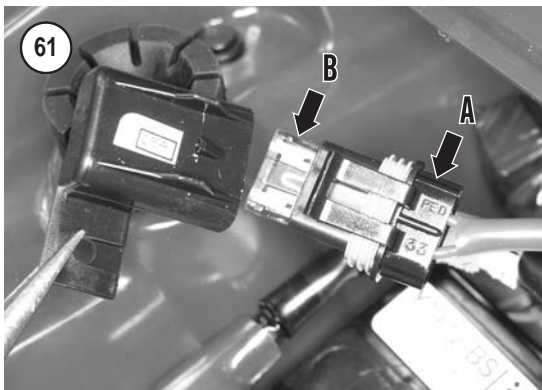
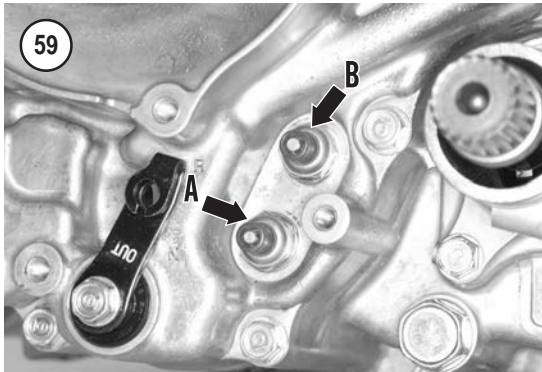
1. Remove the seat, left side cover and left rear mudguard as described in Chapter Fourteen.
2. On the left side of the alternator cover, remove the mounting bolts (A, **Figure 57**) and cover (B) from the reverse stopper lever.
3. Disconnect the electrical connectors (**Figure 58**) from the neutral switch (A, **Figure 59**) and the reverse switch (B) on the left side of the alternator cover.
4. Connect ohmmeter leads between the terminal in the center of the neutral switch body and a good ground. The switch should have continuity (low resistance) when the transmission is in neutral and have no continuity (infinite resistance) when the transmission is in gear. Replace the neutral switch if it fails either test.
5. Connect the ohmmeter leads to the terminal in the center of the reverse switch body and a good ground. The switch should have continuity (low resistance) when the transmission is in reverse and have no continuity (infinite resistance) when the transmission is in any other gear or neutral. Replace the reverse switch if it fails either test.
6. Installation is the reverse of removal. Reconnect the neutral/reverse switch electrical connector securely.

2003-on models

The neutral/reverse switch is mounted internally on these models. It is only possible to test the switch at the bullet connectors.

1. Remove the seat and the left side cover as described in Chapter Fourteen.
2. Follow the harness from the alternator cover to the bullet connectors.
3. Connect ohmmeter leads between the bullet connector of the light green neutral switch wire and a good ground. The switch should have continuity (low resistance) when the transmission is in neutral and have no continuity (infinite resistance) when the transmission is in gear.
4. Connect the ohmmeter lead between the bullet connector of the green neutral switch wire and a good ground. The switch should have continuity (low resistance) when the transmission is in neutral and have no continuity (infinite resistance) when the transmission is in any forward gear or neutral.
5. If the switch fails either continuity test, replace it.





Neutral/Reverse Switch Replacement

2001-2002 models

1. Remove the reverse stopper lever cover and the neutral/reverse connectors as described in *Neutral/Reverse Switch Continuity Test* in this section.
2. Unthread and remove the neutral switch (A, **Figure 59**) or reverse switch (B). Make sure the sealing washer comes out with the switch.
3. Installation is the reverse of removal. Not the following:

- a. Tighten the neutral or reverse switch to 13 N•m (115 in.-lb.).
- b. Reconnect the neutral/reverse switch electrical connector (**Figure 58**) securely.
- c. Start the engine and check the neutral/reverse switch indicator light operation.

2003-on models

The neutral and reverse switches are combined into a single switch that is mounted inside the alternator cover. This switch has the same leads and is tested the same as earlier models using two separate switches. To replace this switch, it is necessary to remove the alternator cover.

Refer to *Alternator Cover* in Chapter Five.

FUSE

When the fuse blows, determine the reason for the failure before replacing the fuse. Usually the trouble is a short circuit in the wiring, which may be caused by worn-through insulation or a disconnected wire touching ground.

Refer to **Table 2** for fuse specifications.

Main Fuse

The fuse box (**Figure 60**) mounts to the battery compartment.

1. Remove the seat (Chapter Fourteen).

CAUTION

If the main fuse is replaced with the ignition switch turned on, an accidental short circuit could damage the electrical system.

2. Make sure the ignition switch is turned off.
3. Unlock the clasp on the fuse box and separate the halves of the fuse box (A, **Figure 61**).
4. Remove the main fuse (B, **Figure 61**) from the connector.
5. Install by reversing the removal steps.

WIRING DIAGRAMS

The wiring diagrams are located at the end of this manual.

Table 1 ELECTRICAL SYSTEM SPECIFICATIONS

Battery	Specification
Capacity	12 V – 8 AH
Current draw (maximum)	1.0 mA
Voltage	
Fully charged	13.0-13.2 V
Needs charging	Less than 12.3 V
Charge current	
Normal	0.9 A / 5-10 h
Fast ¹	4.0 A / 1.0 h
Alternator	
Capacity	0.13 kW @ 5000 rpm
Charge coil resistance (20° C [68° F])	0.1-1.0 ohms
Regulator/rectifier	Single phase, full-wave rectification
Regulated voltage	14.0-15.0 V @ 5000 rpm
Ignition system	AC CDI
Ignition timing ²	14° BTDC @1700 rpm
Ignition coil peak voltage	100 V minimum
Ignition pulse generator peak voltage	0.7 V minimum
Exciter coil peak voltage	100 V minimum
Spark plug	
Standard	NGK DPR8EA-9 or ND X24EPR-U9
Cold climate (5° C [41° F])	NGK DPR7EA-9 or ND X22EPR-U9
For extended high-speed operation	NGK DPR9EA-9 or ND X27EPR-U9
Spark plug gap	0.8-0.9 mm (0.031-0.035 in.)
Starter brush length	
Standard	12.5 mm (0.49 in.)
Service limit	9.0 mm (0.35 in.)

1. Fast charging should be performed only in an emergency.
2. Not adjustable.

Table 2 BULB AND FUSE SPECIFICATIONS

Item	Specification
Headlight (high/low beam)	12 V-35/35 W x 2
Taillight	12V-5W
Reverse/Neutral Indicator	12V-1.7W x 2
Main fuse	15 A

Table 3 ELECTRICAL SYSTEM TORQUE SPECIFICATIONS

Item	N•m	in.-lb.	ft.-lb.
Ignition pulse generator	6	53	—
Neutral and reverse switches	13	115	—

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